



# Fire

Fire is a normal part of nature, like precipitation or wind. Many plant and animal species have adapted to fire and can benefit from it. Fires can clean out diseased or dead forage and trees. However, just like floods and other natural disasters, fire can produce dramatic change in a short period of time. Even fire-dependent ecosystems can be damaged by an extremely intense fire. In recent years 60% of fires have been human caused, with 40% being nature caused.

## How Fire Helps

- **Fire leads to new plants**-Some plants need fire. For example Lodgepole pine trees have *serotinous* cones – this means that they require fire to open. Other plants such as bunch grasses need old, dead leaves to be removed before new grass can grow.
- **Fire cleans up** - without fire, fuels in the form of dead trees and brush build up. Fire creates openings that allow seeds to sprout in sunlight. It recycles minerals from plant materials into the soil. It clears out undergrowth, destroys insect infestations and kills diseases. All of this clean up, can improve wildlife habitat.
- **Fire controls unwanted plants:** Fire can check the growth of invasive woody plants like Junipers, which can take over grasslands.



BLM- Red Canyon Fire

## Detriments of Fire

- **Fire leaves no trace**-Intense fires can burn so hot that they destroy all plant life. It can take years for a forest or rangeland to recover because, there are no seeds to germinate or roots to grow back.
- **Fire changes ecosystems** After an intense fire, the original vegetation is no longer present, so new vegetation replaces it. New plants are reseeded by people, wind or animals; and can be very different than the plants originally in the ecosystem. Since there are no roots to hold the soil, erosion can occur rapidly.
- **Fire welcomes unwanted guests**- Some invasive plants are faster to germinate and grow back more quickly after fires. Without competition, these plants can take over before “desirable” vegetation is able to come back.

## Elements of Fire: What is Fire? How does it burn?

Fire is the result of a chemical reaction that requires the presence of heat, fuel, and oxygen – which create the “Fire Triangle.”

**Fuel** is any material that will burn. **Heat** from the fire’s ignition decomposes compounds, releasing the flammable gases that react with **oxygen** to burn.

With intense heat and adequate fuel, fire increases the wind around it (which brings in more oxygen). As long as there is fuel, fires will increase the other elements of the fire triangle (heat and oxygen) to keep burning.



## Influences on Fire Behavior

Fire behavior has 3 main influences: fuel, topography and weather.

**Fuels** are the living or dead plant material above the ground’s surface that can burn. The density and moisture of ground and aerial fuels (trees/shrubs) affect the severity of fire. The more compact the ground vegetation, the hotter the fire and the quicker it spreads.

**Topography** includes land features like slope and aspect (i.e. south/north side of mountains). Steeper slopes will burn more rapidly, because the fire has more access to oxygen and it is going uphill. A Southern aspect will burn quicker, because it is hotter and drier due to sunlight, where a northern aspect is cooler and has more moisture due to it being shaded from the sun.

**Weather** affects fire because of the humidity (moisture in the air) and temperature of the atmosphere. This affects

fuel moisture, which determines how quickly or slowly fuels will ignite and burn.

Fire changes the weather around it. When the hot air from a fire rises, fresh air rapidly moves in producing wind; bringing more oxygen to the fire.

## Fuel Management

Fuel management on rangelands changes fire behavior by affecting the amount of fuel on the surface and in the top layer of soil. It also affects how much fuel is available (fuel loading), and ladder fuels (vertical vegetation – grasses to shrubs to trees). There are different treatments that can be used to manage fuels such as:

**Livestock and wildlife grazing**- Animals eat plants, which reduces fuel and recycles nutrients as manure.

**Mechanical treatments** -involve different mechanized tools to remove plants. Some examples include:

- Tilling
- Chaining
- Mowing
- Mastication & Feller Bunchers- which chop trees or shrubs

**Manual treatment**- The use of hand tools to remove plants.

**Herbicides**- chemicals that kill or injure plants.

**Prescribed Burning**- The intentional application of fire when the weather conditions will not likely lead to an intense fire. This can change the amount of fuel, and also where fires will or will not burn in the future.

Brought to you by the Idaho Rangeland Resource Commission with information from: “Fuel Treatments on Rangelands” by Philip S. Cook & Jay O’Laughlin- University of Idaho, and “Exploring Wildland Fires”- Educators Guide by BLM.